

## Reduced Graphene Oxide Counter Electrode for Dye Sensitized Solar Cells

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Dye sensitized solar cells (DSSCs) have received great attention due to their low manufacturing cost, simple fabrication technology and relatively high efficiency. In DSSCs, Platinum (Pt)-based electrodes have been widely employed as counter electrodes (CEs) due to their high conductivity, superior electrocatalytic activity and high chemical stability. However, its use for large-scale industrial production is limited due to high cost, limited availability, and corrosion in the electrolyte. Recently, carbon materials have emerged as promising candidates for CEs due to their availability and high conductivity. In this study, we designed and fabricated DSSCs using reduced Graphene Oxide (rGO) as CEs. Graphene Oxide (GO) films were fabricated on a stainless steel substrate by electrophoretic deposition (EPD) of an aqueous GO electrolyte. Reduced Graphene Oxide (rGO) electrode was prepared by thermal reduction of GO films. To study the effect of the thermal reduction temperature of rGO on the photovoltaic performance of DSSCs, a series of rGO films was fabricated by varying the reduction temperature of rGO. DSSCs with rGO CEs reduced at 300 °C showed the maximum power conversion efficiency of 2.29%. The synthesized rGO films were characterized by Raman spectroscopy. The results suggest that, with further modifications, the synthesized rGO films can be used as substitutes for Pt as the CEs in DSSC applications.

**Keywords:** Dye sensitized solar cells (DSSCs), Electrophoretic deposition, Graphene Oxide, Raman spectroscopy, Reduced Graphene Oxide.

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